THE GAME FISHES OF INDIA[1].

BY

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(*With 3 plates and 2 text-figures*).

(*Continued from page 532 of Vol.* xlii, No. 3).

XIV. THE MAHSEERS OR THE LARGE-SCALED BARBELS OF INDIA.

7. THE BLACK MAHSEER WITH NOTES ON OTHER COLOUR VARIETIES.

Mr. R. E. Parsons, F.R.E.S., Indian Police, Dibrugarh, Lakhimpur District, Assam, directed the attention of the Bombay Natural History Society to the lack of information about Black Mahseer in my series of articles on the Game Fishes of India and made the following interesting observations in his letter of May 5, 1941 :—

'I have read with great interest Dr. Sunder Lal Hora's series, *The Game Fishes of India,* with particular reference to Mahseer. I have not, unfortunately, got the numbers of the *Journal* in which they were published before me at the moment, but one point has struck me, which I think is correct and that is that Dr. Hora makes no mention of a *black* Mahseer. I do not know whether these black fish are a distinct species of Mahseer or whether they are instances of melanism. They inhabit the same water, take the same bait and fight in exactly the same way as the ordinary Mahseer that one usually obtains in Assam rivers. They are also of the same shape, but the colour is definitely black with a little white about the belly scales. I have personally caught only two of these black Mahseer. The first I obtained on the 19th November 1934 on the Sisseri river in the Sadiya Frontier Tract, Assam. It weighed 16 lbs. and was a game fish, giving an excellent fight on a light 7 ft. 'Victor' rod. The other I caught at Ukiam on the Um Khri river in Kamrup District, also in Assam, on the 29th December 1937. This latter fish weighed $11\frac{3}{4}$ lbs. and had a little more white about the belly. These black fish are evidently very rare, although they are occasionally caught. Mr. F. Needham of Munkongselek, in the Sadiya Frontier Tract, has obtained several, the biggest being just over 20 lbs. I enclose photographs of the specimen I obtained on the Sisseri where it is photographed with the remainder of my catch for that day; the contrast in colour is very striking. It is noticeable that even the fins are black, as well as the tail. I do not think that it can possibly be that the black colour of these fish is due to the nature of the bed of the river they inhabit, for there are the ordinary type of Mahseer in the Um Khri and the four fish on the right of the enclosed photograph, including the black specimen, all came from the same pool in the Sisseri. The other three fish show the usual colouration. This pool was not very deep and had a sandy bottom at the lower end with small boulders at the top end. The river is in a wide valley at this point and was by no means in a dark gorge.

'There was no doubt that the two specimens I got were Mahseer and not some other species. The general shape and appearance were quite unmistakable. It was only the colour which was so completely different. It is, I suppose, quite possible that melanism is met with in fish as in other orders.'

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In a subsequent letter, dated 31st May 1941, Mr. Parsons referred to two more records of Black Mahseer from Assam and stated:

'On looking more closely through my records, I find that I have caught two other black Mahseer besides those mentioned in my previous letter. The two fish I did not mention previously were caught (1) on the Syon River, a tributary of the Brahmaputra on its right bank about 40 miles north of Pasighat in the Sadiya Frontier Tract. This fish weighed 18 lbs. and the name of the place I caught it was Pangin. (2) The other fish was caught at Rongdoi near the confluence of the Brahmaputra and the Lohit on 29th January 1937 and it weighed 10 lbs. Rongdoi is also in the Frontier Tract.'

Mr. Parsons' surmise about the identity of his Black Mahseer is correct and morphologically the black specimen photographed by him (Plate ii, fig. 2) is indistinguishable from the common Mahseer of Assam, *Barbus* (*Tor*) *putitora* (Hamilton). It may be pointed out that though melanism is not so common a phenomenon in fishes as albinism, several interesting cases of melanism in divers types of fishes are on record. Attention is directed below to some of these cases.[1]

In 1871, Günther (**6**) recorded a black specimen of *Platyglossus notopsis* Blkr., and observed:

'We have received from the Godeffroy Museum a specimen from Savay of a uniform black colour; however, the two ocelli on the dorsal fin are present, and it has also thirteen soft dorsal rays, so that it must be regarded as merely a variety.'

In 1875, Fatio (**4**) discussed melanism in *Phoxinus laevis* and concluded that though the nature of food is generally responsible for melanism, in the case of *P. laevis* presence of Helminth parasites encysted in the skin of the fish were probably the cause of the change in colouration. Knauthe (**13**) was of the opinion that melanism in fishes resulted not from the nature of the food taken by them, but through lack of food, *i.e.*, starvation. He had observed melanism in *Cyprinus carpio* var. *nudus* v. *alepidotus*, *Carassius carassius*, *Gobio fluviatilis*, *Leucaspius delineatus*, *Leuciscus phoxinus*, *Nemachilus barbatulus* and *Esox lucius*. In an important contribution on melanism in animals in general, Klunzinger (**11**, pp. 280, 281) dealt with some of the earlier records among fishes and considered the secretion of black pigment under the following headings: (*a*) inner constitutional peculiarities and (*b*) external factors, such as (i) influence of light, (ii) influence of temperature, (iii) influence of humidity (iv) influence of food and (v) influence of climate. Four years later, he (**12**) observed a large proportion of frogs and trout of certain ponds with a uniform black colour and ascribed this colour peculiarity to the acids produced by the humus soil. At the same time, he referred to the changes of colouration in the males of certain fishes during the breeding season. Annandale (**1**) described certain melanic specimens of *Barbus ticto*, but Hora, Misra and Malik (**8**, p. 267) found them to be males of *B. conchonius* and stated (p. 270) that during

[1] Numerals in thick type within brackets refer to the serial number of the various publications listed in the bibliography at the end of the paper.

the breeding season males of several species of Carp-Minnows develop melanic colouration.

In 1935, Goff (5) recorded a case of melanism in *Lepisosteus osseus* and observed:

'During April 1933, while gigging gars in Lake Harris, Lake County, Florida, a melanistic specimen was picked up. It was the common long-nosed gar, *Lepisosteus osseus*. At first it was thought that it might be covered with some foreign substance but a vigorous washing and closer examination showed the coloring to be in the specimen itself. Since the writer had never seen a gar that approached this one in color a picture was taken of the specimen beside a normally colored individual. This picture brings out fairly well the degree of darkness in comparison with the normal.'

The observations recorded by Goff are similar to those made by Mr. Parsons regarding the Black Mahseer (*vide supra*, p. 803).

An interesting case of localized cutaneous melanosis occurring in lungfishes (*Lepidosiren*) of the New York Aquarium is recorded by Smith and Coates (**19**). They are of the opinion that 'Abnormal black pigmentation of the skin of fishes seems to depend on both genetic and post-embryonal factors.' Further, it is stated that 'Pathologic pigmentation of the skin caused by an increase in the number of melanophores occurs, for example, when certain parasitic larvae gain access to the skin and become encysted.' Attention is also directed to the fact that 'Experimental studies covering a wide biological field attribute pigmentation to disturbances involving the endocrine system or enzyme activity.'

So far as I am aware, the melanic pigmentation of Black Mahseer has not been properly investigated, but from the nature of the records available it seems that it may either be due to some genetic or pathological causes. As pointed out by Mr. Parsons, there is no difference in the ecological conditions of the Black and Ordinary Mahseer which could account for melanism among these giants of fresh waters.

The first reference to Black Mahseer I have been able to find is by Macdonald (**14**, p. 305) who regarded it as a distinct variety and characterized it as follows:—

'3. *The Black Mahseer.*—He is quite a different fish and of a stocky build. Head small and black, mouth small. Barbels and eyes black.

'This fish is marked by a jet black line two half scales above the lateral line, scales above having a tinge of gold on the scale tips running to jet black on the back. Below lateral line scales are lighter but dirty white, almost shot black to the scales on belly, which are dirty white with a black fringe. Fins black with grey at base. Best fish taken 19 pounds.'

The above description is not sufficient to distinguish the variety, but fortunately a good photograph of the black variety along with 4 ordinary Mahseer is published by Macdonald (plate i, fig. 2). A study of the figure shows that though the depth of the body is proportionately greater than that in the ordinary type, the length of the head is considerably greater than the depth of the body. On this character alone, it is possible to regard it as conspecific with the ordinary type—*Barbus* (*Tor*) *putitora* (Hamilton). The greater depth of the body may be due to its being a mature female.

In 1933, Macdonald (**15**) described once again the varieties of Mahseer in Burma and regarding the Black Mahseer stated (p. 107)

that it is common in all the rivers of Burma, where the banks are thickly wooded. Earlier, on p. 106, it is mentioned about the Black Mahseer that it 'is common both in India and Burma, where the banks of streams are overgrown with thick forest.' According to Macdonald, therefore, there is a correlation between melanism in Mahseer and the type of locality frequented by such specimens. There is no doubt that environment plays considerable part in determining the colouration of a fish, but how far melanism in Mahseer is due to the shade-factor in its habitat I am unable to say. (For further discussion on this point see below pp. 811-814).

Shebbeare (**18**) described a Dark Variety of Mahseer from the Eastern Himalayas and stated:

'The dark fish, or this specimen at any rate, was in shape far more like a Katli than a Mahseer. The fins were partly the yellow of the Mahseer and partly the slate colour of the Katli—the general colour of the fish was intermediate but the eye was golden, as in the Mahseer; only one spot on one iris was copper as in the Katli, but this may have been blood-shot. There were no tubercles on the upper lip.'

The Dark Mahseer of Shebbeare was a thick-lipped specimen with the length of head, as shown in the sketch, considerably shorter than the depth of the body. There seems hardly any doubt that Shebbeare was dealing with a partially melanic specimen of *Barbus (Tor) tor* (Hamilton).

From South India also there is a record of a Black Mahseer. Van Ingen (**10**), in his observations on Mahseer Fishing in Mysore, gives a figure of a Black Mahseer which is not unlike the ordinary Mahseer of the Mysore waters—*Barbus (Tor) khudree* Sykes (Hora, S. L. and Misra, K. S.—*Journ. Bombay Nat. Hist. Soc.*, vol. xl, pp. 24-28, 1938).

From the records of Black Mahseer referred to above, it is clear that it cannot be regarded as a distinct variety, since melanic specimens belonging to different species have been described or figured as Black Mahseer.

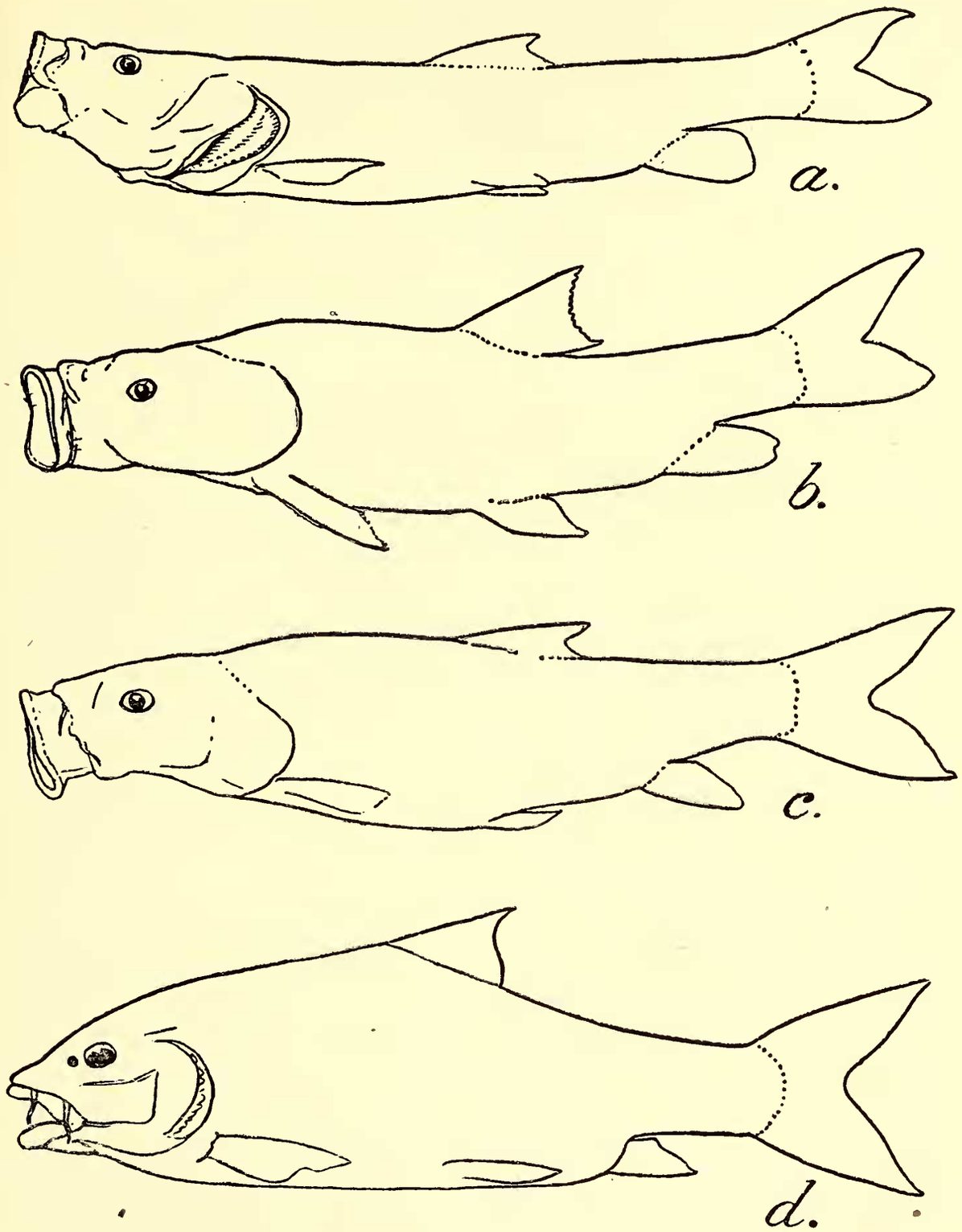
Though relying on the authoritative work of Day (**3**), different kinds of Mahseer have been treated as one species, *Barbus tor* (Hamilton), the anglers have long been familiar that there are more than one kind of Mahseer in Indian waters. But unfortunately in recognising varieties, anglers have been influenced by the colour of their specimens or by the nature of the lips. It has been pointed out in my articles on Mahseer (**9**) that these characters are not constant and, therefore, very little reliance can be placed on them for distinguishing species. In this connection, it may be recalled that Hamilton (**7**), who was the first person to make Mahseer known to science, recognised three species from the Himalayas, *Cyprinus putitora, C. tor* and *C. mosal*. Hamilton was familiar with the affinities of the three species and under *C. putitora* he observed:

'This and the two following species have, in many points, a strong resemblance, being very large fishes, affording an excellent wholesome nourishment, free from bones, although not quite so delicate as the *Rohita*. They are all

Fig. 1.—A Black Mahseer from Mysore.
(Reproduced from *Journ. Darjeeling Nat. Hist. Soc.*, vol. xii, facing page 30, 1937).

Fig. 2.—A Black Mahseer (15 lbs.) from Burma in the centre with four ordinary Mahseer (38, 21, 9 and 6 lbs. respectively). (Reproduced from *Journ. Bombay Nat. Hist. Soc.*, vol. xxxiii, facing page 304, 1929. This illustration has also been published in the *Journ. Darjeeling Nat. Hist. Soc.*, vol. vii, 1933).

also strong, well formed, handsome fishes, peculiarly distinguished by the enormous size of their scales, which, in large individuals, almost equals the hand, insomuch, that cards for gaming are sometimes made of them at Dakha. *Mahasaula* and *Tora*, variously altered or corrupted, or with various additions, may be considered as generic appellations among the natives for these fishes, all of which frequent large rivers.'



Text-fig. 1.—Outline sketches of Black Mahseer from different parts of India.

a. A specimen from Assam (From a photograph sent by Mr. R. E. Parsons, *vide* Plate ii, fig. 2); *b*. A specimen from Mysore (After van Ingen, *vide* Plate i, fig. 1); *c*. A specimen from Burma (After Macdonald, *vide* Plate i, fig. 2); *d*. A specimen from the Eastern Himalayas (After Shebbeare, *Journ. Darjeeling Nat. Hist. Soc.*, vi, p. 73, 1931).

Though in the 3rd edition of his *Rod in India,* Thomas (**20,** p. 27) bowed before the authority of Day and recognised *Barbus tor* as equivalent to Mahseer, he made it clear that:

'Further experience has confirmed me in the view advanced in 1873, that there are more Mahseers than have been named, and that if it were possible that as much accurate attention could be given to the Mahseer as has been devoted to the Salmonidae of Great Britain, of Europe, and of America, it would be found that the Mahseers of India would likewise grow in numbers.'

Thomas, chiefly dealing with South Indian Mahseer, was of the opinion 'that there are at least three distinct forms with difference of external structure, and many more with differences in colouring.'

This has been the feeling of all subsequent writers on angling in India, but no one dared to challenge the views of Day as regards the scientific nomenclature of this important group of fishes. In 1919, Annandale (**2,** p. 134) broke away from the orthodox view and while commenting on the systematic position of the Indian species assigned to *Barbus* Cuvier made the following remarks concerning Mahseer:

'Indeed, there is no group in which confusion is greater than that of the Mahseer so familiar to Indian sportsmen.

'I have not the material to attempt a revision of the Mahseer group, specimens of which are difficult to preserve in large series on account of their size, but two species have recently come to my notice which it seems justifiable to rescue from the oblivion of synonymy as they possess differential characters of a marked nature and likely to be constant. These species are *Barbus putitora* (Ham. Buch.) and *Barbus mussullah,* Sykes. That Hamilton's *mossul* and Jerdon's *hamiltonii* differ in some respects from the *forma typica* of *Barbus tor* the collection in the Indian Museum provides abundant evidence, while specimens from the upper Kistna seem to differ from any of these; but the question whether the differences should be considered specific or merely racial must be left to be answered with more extensive experience.'

In the preceding articles on the Large-scaled Barbels of India, I (**9**) have attempted to differentiate between the forms found in North India and shown that, besides the three species described by Hamilton, there is probably another species, *Barbus (Tor) progeneius* McClelland, in the rivers of Assam (*Jungha* of the Assamese). The Katli of the Nepalese or Bokar of the Assamese, *B. (Lissochilus) hexagonolepis* McClelland has also been described, but this fish is not a Mahseer in the true sense of the word, for its labial groove is interrupted in the middle and the lips never form flaps. I have thus recognised 5 species of Large-scaled Barbels from Northern India and Burma, but the specific identity of *progeneius* is rather doubtful. From these regions, Macdonald (**14; 15**), Shaw and Shebbeare (**16**) and Shebbeare (**17, 18**) have recognised several varieties of Mahseer and it may be worthwhile to comment here on their scientific position.

From his experience of fishing in the Myitkyina District, Northern Burma, Macdonald (**14,** p. 304) recognised six different varieties of Mahseer, though he noted that 'They all fit the description of Dr. Day's *Barbus tor* in the main points i.e. Barbels, "Fin" rays, and lateral line, etc.' His first variety is the Golden or Himalayan

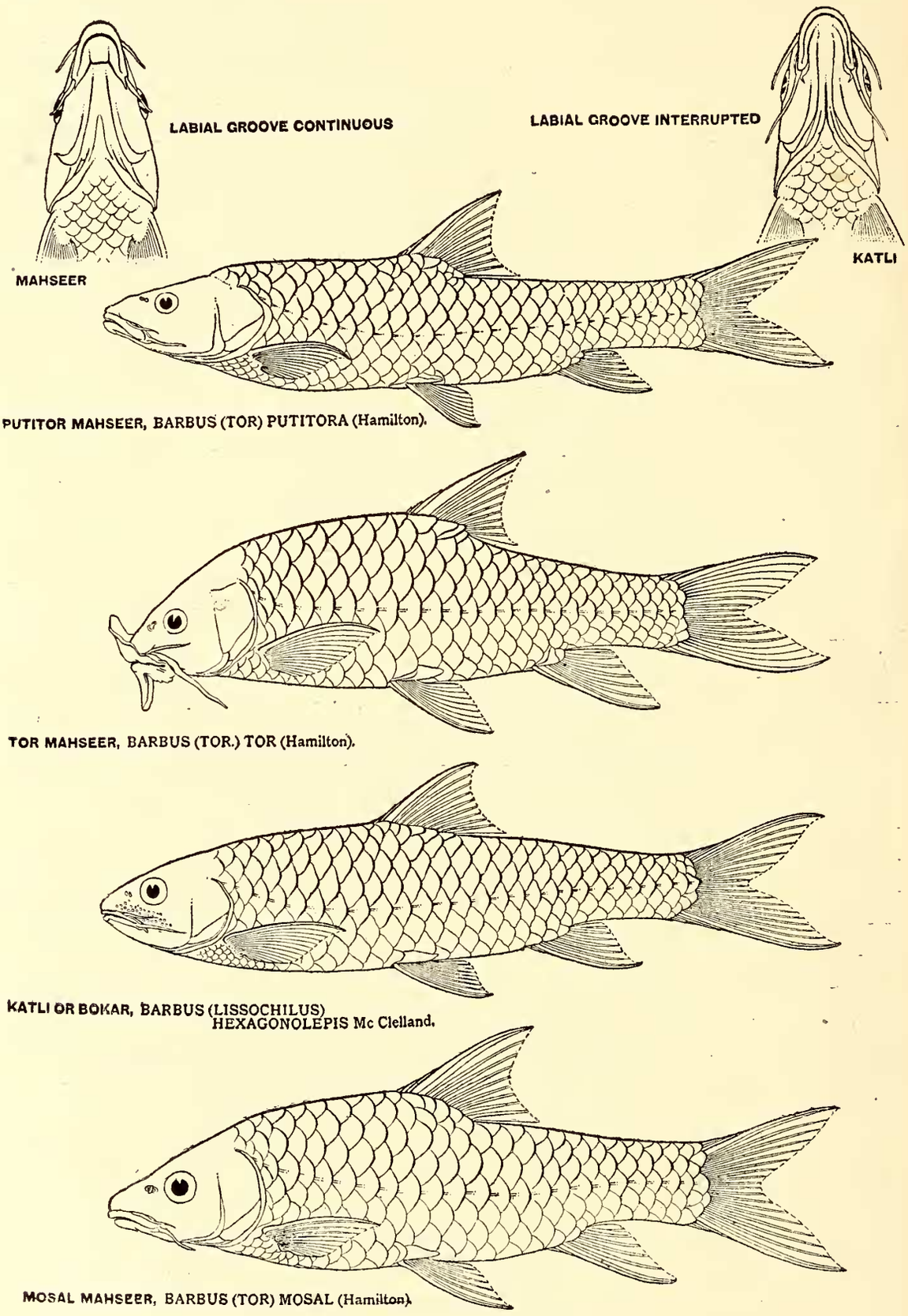
Mahseer with a decided black line down the side. His photographs show that this is *Barbus* (*Tor*) *putitora* (Hamilton). The Thick-lipped variety is described as 'Same colouring as Himalayan Mahseer differing only in the head. Chief features are the thick lips with the adipose extension which is well illustrated in Thomas' *Rod in India*.' It has been shown in my previous articles (9) that extensions of lips may occur in several species of *Barbus* of South-eastern Asia and Africa and though the true significance of these structures is not clear, they cannot be regarded as specific or racial characters. The Thick-lipped variety is also stated to be fairly common. Regarding the Black variety, it has been shown above (*vide supra*, p. 806) that it is only a convenient name for the melanic specimens of different species. His photographs of both the Thick-lipped and Black varieties show that they are referable to *Barbus* (*Tor*) *putitora* (Hamilton). Mr. Macdonald sent me another photograph of his Black variety from Burma and this proved to be *B.* (*Lissochilus*) *hexagonolepis*. It would thus appear that colouration served as the main character for differentiating varieties. The photograph of the Copper Mahseer shows that its head is almost equal to the depth of the body and on this character it is possible to assign it to *Barbus* (*Tor*) *mosal* (Hamilton). This species is more commonly met with in Burma. The Chocolate Mahseer, with thin lips and bright orange spots under lower jaw on chin, is probably *B.* (*Lissochilus*) *hexagonolepis* McClelland, while the specific identity of the Red Mahseer is difficult to ascertain as the author has not published a figure of the variety. Mr. Macdonald has very kindly sent me a photograph of this variety (Pl. ii, fig. 1) which shows that this is also referable to *B.* (*Lissochilus*) *hexagonolepis*.

In 1929, Shaw and Shebbeare distinguished four varieties of Mahseer from the Dooars, the Teesta and North West Assam. Their 'Commonest' type and the 'Greyhound' type are undoubtedly *B.* (*Tor*) *putitora*. The very thick-lipped and red-finned type, the so-called cock-fish, was at first regarded as a separate variety, but next year Shebbeare (17) considered it to be a 'breeding phase rather than a variety'. The fourth variety, from the description given, seems to be *B.* (*Tor*) *tor*. The specimen figured as 'Young of Commonest Type (?)' has a head shorter than the depth of the body and would thus seem to belong to Tor Mahseer. In 1931, Shebbeare (18) described a Dark variety which has been referred to above and seems to be a melanic specimen of *B.* (*Tor*) *tor*.

In commenting on Shebbeare's articles, Macdonald (15, p. 105) redescribed the varieties of Mahseer met with in Burma, and reiterated that the Thick-lipped variety is quite distinct and not a sex-phase of some other variety. According to him, the cock-fish of this type has 'a bump on the nose, and a more developed appearance about his whole form'. The distinction between the two sexes is given as follows:

> 'The male fish can easily be distinguished by the swelling or fleshy protuberance on the nose being extended farther and being more fully developed than in the female. The lips of the male fish are also much thicker and coarser than those in the female fish.'

I (9) have discussed fairly fully the causes which may be responsible for the enlargement of the lips in Mahseer, but observations are lacking to elucidate the exact significance of the hypertrophied lips. In view of the fact that individuals with hypertrophied lips



Text-fig. 2.—Mahseers or Large-scaled Barbels of Himalayan waters.

are to be found in practically all the species of Mahseer, this character cannot be regarded as a specific or racial feature.

The following key may help to distinguish specimens, over 9 inches in length, of the species of the Large-scaled Barbels of Northern India and Burma.

I. Labial groove interrupted in the middle; lips comparatively thin and never hypertrophied; cheeks covered with tubercles.

Barbus (*Lissochilus*) *hexagonolepis* McClelland.
The Katli of the Nepalese and Bokar of the Assamese. The Chocolate, Olive, Black or Red Mahseer of Burma.

II. Labial groove continuous; lips thick and well formed, sometimes produced into adipose flaps; cheeks smooth.[1]

A. Length of head considerably greater than depth of body.
Barbus (*Tor*) *putitora* (Hamilton).
The Golden or the Common Himalayan Mahseer including Greyhound and thick-lipped varieties.

B. Length of the head considerably shorter than or more or less equal to depth of body.

1. Length of head considerably shorter than depth of body.
Barbus (*Tor*) *tor* (Hamilton).
The Deep-bodied Mahseer.

2. Length of head more or less equal to depth of body.
Barbus (*Tor*) *mosal* (Hamilton).
The Copper Mahseer.

Addendum.

Copies of the typescript of the above article were sent to a number of well known anglers in India and their suggestions were solicited. Messrs. R. E. Parsons (Assam), A. Macdonald (United Provinces), C. Fairweather (Bengal) and Lt.-Col. R. W. Burton (Mysore) have very kindly sent their comments which throw further light on Black Mahseer and other races and varieties of this game fish.

Mr. Parsons notes that though Mr. R. W. Godfrey, Indian Police, Political Officer, Sadiya Frontier Tract, Assam, has caught several Black Mahseer, he has kept no records of them. 'The only one about which he was able to give me any details was a fish of about a pound in weight, caught on the Deopani river near Sadiya. This seems to indicate that the black colouration is inherent in this type of fish from a very early age.' Mr. Godfrey also mentioned to Mr. Parsons 'that while fishing in the Siang (Brahmaputra), some considerable distance into the hills north of Pasighat in the Frontier Tract, he noticed that the Bokar he killed were of a dark purple-plum colour instead of being the usual type. The Siang Valley in that locality is very shut in and even the water and stones in it looked black. It therefore seems that the dark colouration of the Bokar in the area referred to is due to conditions of environment and not to any question of melanism. However,

[1] In some of the true Mahseers of the Deccan and Southern India, tubercles are present on the cheeks. These forms will be dealt with in the subsequent articles of this series.

the Mahseer caught there were not different from the usual type.' Mr. Parsons on the basis of his records of Mahseer fishing finds that one black specimen turns up for about every 800 fish caught in Assam waters.

Mr. C. Fairweather in his communication to Mr. C. M. Inglis, Curator, Natural History Museum, Darjeeling, stated ''"Black" Mahseer are quite common : I am inclined to agree that "wooded" banks have something to do with this *protective* colouring. . . I also caught Black Mahseer and Ordinary Mahseer from the same pool but the fish were travelling up at that time so the "same pool" means nothing.'

Mr. Fairweather also directs attention to another type of Mahseer—nicely streamlined, which is found in the Champamati, District Goalpara, and looks like a Katli with a sharper head but has the eyes and scales of a Mahseer. It is stated to be 'Very short and very deep in the belly . . . His tail and fins were bright red'. He suspects it to be a *cross-breed* and states 'There must be innumerable "crosses" between various types of Mahseer with infinite *modifications* of "lips". I cannot see the males of one type carefully selecting females of the same type for attention or rather "attendance". Therefore "noses" will get graded up or down.'

Hybridisation is a fairly common phenomenon among Carp or Cyprinid fishes and several instances have already been described. I (*Rec. Ind. Mus.*, vol. 36, pp. 307-310, 1934) have myself described cross-breed between two snow trouts—*Schizothorax labiatus* McClelland and *Oreinus sinuatus* var. *griffithii* McClelland and shown the occurrence of all gradations between the trilobed lower lip of the former and the papillated, flat lip of the latter. Mr. Fairweather's suggestion is very valuable and needs close scrutiny at the hands of those who have opportunities to handle large series of specimens of these game fishes. It is likely, however, that the nicely streamlined Mahseer of the Champamati may have been *Barbus* (*Tor*) *mosal* (Hamilton).

Col. Burton also states that Black Mahseer are found in the Cubbany River near Kartikolam below Manantoddy and he caught one black specimen of 5 lbs. (Plate ii, fig. 3) from the Bhavani also. He is also inclined to attribute variations in colouration to environmental factors. He states that :

'The pool in the Bhavani river where I caught the Black Mahseer was deep and shadowed by giant trees. The upper waters of the Cubbany river are in many places similarly dark and gloomy. So I feel sure that environment has much to do with the colouration of Black Mahseer.

'Many of the Mahseer taken by my party in the upper waters of the Kakki Ar in Travancore in 1933 were very deep in colour. That was a stream with much peaty looking water and running through thick forest.

'From the fact that during many years I never saw a Black Mahseer in the open sunlit rivers of Central India and Hyderabad—Godavery, Beema, Kistna, Tungabadra—it would seem that Mahseer of this colouration are not in those rivers, at any rate in the plains portions of them.'

Col. Burton has so far collected only one specimen of the Thick-lipped type in the Indravati on the Central Provinces border.

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Fig. 1.—A Red Mahseer from Burma. (Reproduced by courtesy of Mr. A. St. John Macdonald.)

Fig. 2.—A Black Mahseer (second from left, 16 lbs.) from Assam with six ordinary Mahseer. (Reproduced by courtesy of Mr. R. E. Parsons.)

Fig. 3.—A Black Mahseer (5 lbs., smallest specimen) from the Bhavani River with two ordinary Mahseer. (Reproduced by courtesy of Lt.-Col. R. W. Burton.)

Fig. 4.—A Black Mahseer from the Kumaon Hills. (Reproduced by courtesy of Mr. A. St. John Macdonald.)